INDEX

A

A closer look at the natural substrate for a nerve-gas hydrolyzing enzyme in squid nerve, 197
A common theme for LIM homeobox gene function across phylogeny? 377
A high-affinity hemoglobin is expressed in the notochord of amphioxus, *Branchiostoma californiense*, 255
A little shell to live in: evidence that the fertilization envelope can prevent mechanically induced damage of the developing sea urchin embryo, 214
ABDU, URI, PETER TAKAC, HANS LAUFER, and AMIR SAGI, Effect of methyl farnesoate on late larval development and metamorphosis in the prawn *Macrobrachium rosenbergii* (Decapoda, Palaemonidae): a juvenoid-like effect? 112
Abducens, 220
Acetylcholine, 196
Adhesive force, 145
Aesthetasc, 184
Agonistic encounter, 156
AKAM, MICHAEL, Hox genes in arthropod development and evolution, 373
Allorecognition, 98
Alpha peptides, 308
Alterations in cholinergic signaling modulate contraction of isolated sea urchin tube feet: potential role of nitric oxide, 196
Amphioxus, 255, 260
Anatomy, 260
ANDERSEN, KRISTEN A., and ROBERT PAUL MALCHOW, Fluorometric analysis of intracellular sodium concentrations in isolated retinal horizontal cells, 204
Annelida, 251
Annual Report of the Marine Biological Laboratory, R1
Antennule, 182
Aplysia bag cell neurons, 201
Artemia, 112
Ascidian, 60, 98, 381
ATEMA, JELLE, see Matthew Weaver, 180; Carla M. Guenther, 182; Elizabeth Quinn, 185
ATEMA, JELLE, Tracking turbulence: processing the bimodal signals that define an odor plume, 179
Atlantic Ocean, 337
Auditory system, development, 218
Axial patterning in the leech: developmental mechanisms and evolutionary implications, 370

B

BAKER, R., see M. F. Kubke, 218
BAKER, ROBERT, see Hans Straka, 220
BALLANTYNE, J. S., see J. A. Stuart, 12
BANASZAK, ANASTAZIA T., see Nadav Shashar, 187
BARLOW, ROBERT B., see Vanessa J. Ruta, 189
Barnacle nervous system, 282
BAVESTRELLO, GIORGIO, UMBERTO BENATTI, BARBARA CALCINAI, RICCARDO CATTANEO-VIETTI, CARLO CERRANO, ANNA FAVRE, MARCO GIOVINE, SERENA LANZA, ROBERTO PRONZATO, and MICHELE SARÀ, Body polarity and mineral selectivity in the demosponge *Chondrosia reniformis*, 120
Behavior
  agonistic, 156
  feeding, 273
  migratory, 168
  orientation, 193
BENATTI, UMBERTO, see Giorgio Bavestrello, 120
BILLACK, BLASE, JEFFREY D. LASKIN, PRUDENCE T. HECK, WALTER TROLL, MICHAEL A. GALLO, and DIANE E. HECK, Alterations in cholinergic signaling modulate contraction of isolated sea urchin tube feet: potential role of nitric oxide, 196
Bioluminescence, 290
Biomechanics, 136
Biophysics, 5
BISHOP, JAMIE J., THOMAS L. VANDERGON, DAVID B. GREEN, JEANNETTE E. DOELLER, and DAVID W. KRAUS, A high-affinity hemoglobin is expressed in the notochord of amphioxus, *Branchiostoma californiense*, 255
Blockade of ryanodine receptors stimulates neurite outgrowth in embryos of *Spisula solidissima*, 206
Blood
  plasma, 43
  serum chemistry, 228
Blue crab, 168
Body polarity, 120
Body polarity and mineral selectivity in the demosponge *Chondrosia reniformis*, 120
BOURNS, A. E., see J. A. Stuart, 12
Brachyury, 381
BRUCE, ASHLEY E. E., see Marty Shankland, 370
Bryozoans, 126
Budding mode, 319
BULLIS, ROBERT A., see Janice S. Hanley, 223
BURGER, MAX M., see William J. Kuhns, 216
Busycon, 308

C

C. elegans, 377
C to N ratio, 245
CALCINAI, BARBARA, see Giorgio Bavestrello, 120
Calcium, 208
  agonist, 209
  endomembrane stores, 209
  flux, 201
  release, 209
  signal, 209
  speciation, 43
Calcium regulatory endomembranes of the prophase mitotic apparatus of sand dollar cells contain enzyme activities that produce leukotriene B_4 but not 1,4,5-inositol triphosphate, 209
Calcium speciation and exchange between blood and extrapallial fluid of the quahog *Mercenaria mercenaria* (L.), 43
Calexcitin, 198
Callinectes sapidus, 168
CAMERON, R. ANDREW, 361
Camouflage, 337
CARPIZO-ITUARTE, EUGENIO, see Eric R. Holm, 21
CARR, WILLIAM E. S., see Paul J. Linser, 273
CATE, HOLLY S., see Paul J. Linser, 273
CATTANEO-VIETTI, RICCARDO, see Giorgio Bavestrello, 120
CCD camera, 290
α-CDCP, 308
CEBRIAN, JUST, see Martin P.A. Griffin, 233; Suzanne Graham, 241
Cell
  cycle, 107
  lineage, 363, 367
Central nuclei, 218
Centrifuge polarized microscope, 212
Cephalochordata, 255
Cephalopod, 17, 78
CERRANO, CARLO, see Giorgio Bavestrello, 120
Changes in cell lineage specification elucidate evolutionary relations in Spiralia, 367
Characterization of oxygen and calcium fluxes from early mouse embryos and oocytes, 208
Cheliped, 52
Chemoreception, 185
CHIKARMANE, H.M., see Roxanna Smolowitz, 229
Chondrosia reniformis, 120

Choosing objective lenses: the importance of numerical aperture and magnification in digital optical microscopy, 1
Chordate, 60, 381
  origin of, 60
Circadian rhythm, 189
Circulation, 43
Circulatory system, 260
Clam
  giant, 70
  symbiotic, 70
Claw, extra, 52
Cnidae, 145
Cnidaria, 145, 251
Cnidocyte, supporting cell complex (CSCC), 145
Co-localization
  pharyngeal teeth, 273
  taste buds, 273
COBB, CHRISTOPHER S., and RODDY WILLIAMSON, Electrophysiology and innervation of the photosensitive epistellar body in the lesser octopus *Eledone cirrhosa*, 78
Coelom, 260
Coelomic cavities may function as a vascular system in amphioxus larvae, 260
COHEN, WILLIAM D., see Kyeng G. Lee, 211
COLE, MARCI L., see Martin P.A. Griffin, 233
Collagen, 136
Colonial coral, 319
Concepts in Imaging and Microscopy, 1
Concholepas, 308
Confocal, 1
Consensus translational initiation sites of marine invertebrate phyla, 251
COSTELLO, JOHN H., and REBECCA COVERDALE, Planktonic feeding and evolutionary significance of the lobate body plan within the Ctenophora, 247
Counter-illumination, 290
COVERDALE, REBECCA, see John H. Costello, 247
Crayfish, 52
CROLL, ROGER P., see Jeffrey L. Ram, 308
Crustacea, 112, 251, 290, 373
Ctenophore, 247, 363
Cuticular photophores of two decapod crustaceans, *Oplophorus spinosus* and *Systellaspis debilis*, 290
Cuttlefish, 223

D

D- and L-ß-hydroxybutyrate dehydrogenases and the evolution of ketone body metabolism in gastropod molluscs, 12
DAVIS, JESSICA, see Suzanne Graham, 241
Decapoda, 112
DEEGAN, LINDA, see Jennifer Sweeney, 238; Suzanne Graham, 241
DEFFENBAUGH, MAX, see Allen F. Mensinger, 194
Denitrification, 240
Dependence of herbivory on autotrophic nitrogen content and on net primary production across ecosystems, 233
DERBY, CHARLES D., see Paul J. Linser, 273
DETOMASO, ANTHONY W., see Baruch Rinkevich, 98
Development, 260, 377
Di-I dye, 78
Directional auditory responses in the descending octaval nucleus of the toadfish (*Opsanus tau*), 191
Dispersal, 126
Dissolved inorganic nitrogen flux and mineralization in Waquoit Bay sediments as measured by core incubations, 240
Distribution of setae on the *Homarus americanus* lateral antennule flagellum, 182
DODGE, FREDERICK A., see Vanessa J. Ruta, 189
DOELLER, JEANNETTE E., see Jamie J. Bishop, 255
Dorsoventral axis, 363

E

Echinarachnius, 209
Echinodermata, 251
EDDS-WALTON, P. L., and R. R. FAY, Directional auditory responses in the descending octaval nucleus of the toadfish (*Opsanus tau*), 191
Eelgrass, 241, 245
Effect of colony size, polyp size, and budding mode on egg production in a colonial coral, 319
Effect of eelgrass (*Zostera marina*) density on the feeding efficiency of mummichog (*Fundulus heteroclitus*), 241
Effect of larval swimming duration on growth and reproduction of *Bugula neritina* (Bryozoa) under field conditions, 126
Effect of methyl farnesoate on late larval development and metamorphosis in the prawn *Macrobrachium rosenbergii* (Decapoda, Palaemonidae): a juvenoid-like effect? 112
Effects of nitrogen loading on eelgrass seed coat abundance, C to N ratios, and Δ15N in sediments of Waquoit Bay, 245
Effects of vestibular nerve lesions on orientation turning in the leopard frog, *Rana pipiens*, 193
Efferent modulation, 189
Efferent modulation of physiological properties of the *Limulus* lateral eye, 189
Egg, 214
  activation, 107
Egg-laying hormone, 308
Eighth cranial nerve, 218
Electrophysiology, 78
Electrophysiology and innervation of the photosensitive epistellar body in the lesser octopus *Eledone cirrhosa*, 78
Eledone cirrhosa, 78
ELH, see Egg-laying hormone, 308
ELLERS, OLAF, AMY S. JOHNSON, and PHILIP E. MOBERG, Structural strengthening of urchin skeletons by collagenous sutural ligaments, 136
ELLINGTON, W. ROSS, and STEPHEN T. KINSEY, Functional and evolutionary implications of the distribution of phosphagens in primitive-type spermatozoa, 264
Embryo
  chicken, 218
  physiology, 208
Embryology, 370
Endostyle, 60
Energetics, 17
Energy transport, 264
Enzyme, 12
Epistellar body, 78
EPSTEIN, HERMAN T., see Alan M. Kuzirian, 198
Erythrocytes, 5
Escape, 193
Estuarine sediment cores, 243
Euprymna, 89, 326
Evidence for multiple spawning by squids (*Loligo pealei*) in captivity, 225
Evolution, 12, 264, 363, 370, 373, 377
Evolution of cleavage programs in relationship to axial specification and body plan evolution, 363
Expression, 60
Extracellular pH gradients measured from isolated retinal cells, 203
Extracellular recording, 191
Extrapallial fluid, 43
Eye, invertebrate, 187

F

FAVRE, ANNA, see Giorgio Bavestrello, 120
FAY, R. R., see P. L. Edds-Walton, 191
Feeding
  ctenophore, 247
  fish
    efficiency in mummichog, 241
    behavior in largemouth bass, 273

FERNANDEZ-BUSQUETS, XAVIER, see William J. Kuhns, 216
Fertilization envelope, 214
Fibrin-trapping method, 211
Fine structure, oocyte, 212
Fish, feeding efficiency, 241
Flow patterns, 185
Fluorescence
  microscopy, 1
  localization, 211
Fluorescence localization of cytoskeletal proteins in fibrin-trapped cells, 211
Fluorometric analysis of intracellular sodium concentrations in isolated retinal horizontal cells, 204
FOREMAN, KEN, see John Kirkpatrick, 240
Functional and evolutionary implications of the distribution of phosphagens in primitive-type spermatozoa, 264
Functional significance of the co-localization of taste buds and teeth in the pharyngeal jaws of the bass, *Micropterus salmoides*, 273

G

G protein, 21
GABR, HOWAIDA R., see Janice S. Hanley, 223
GALLARDO, CARLOS S., see Jeffrey L. Ram, 308
GALLO, MICHAEL A., see Blase Billack, 196
GARRITT, ROBERT, see Jennifer Sweeney, 238
Gastropoda, 349
Gelatinous zooplankton, 337
Genetic regulatory networks in embryogenesis and evolution, 357
GILLAND, E., see M. F. Kubke, 218; Hans Straka, 220
GIMELBRANT, ALEXANDER A., see Raj V. Mankad, 251
GIOVINE, MARCO, see Giorgio Bavestrello, 120
GODA, MAKOTO, SHINYA INOUÉ and ROBERT KNUDSON, Oocyte maturation in *Chaetopterus pergamentaceous* observed with centrifuge polarizing microscope, 212
GRAHAM, SUZANNE, JESSICA DAVIS, LINDA DEEGAN, JUST CEBRIAN, JEFF HUGHES, and JENNIFER HAUXWELL, Effect of eelgrass (*Zostera marina*) density on the feeding efficiency of mummichog (*Fundulus heteroclitus*), 241
GREEN, DAVID B., see Jamie J. Bishop, 255
GRIFFIN, MARTIN P. A., MARCI L. COLE, KEVIN D. KROEGER, and JUST CEBRIAN, Dependence of herbivory on autotrophic nitrogen content and on net primary production across ecosystems, 233
Growth, 17
GUENTHER, CARLA M., and JELLE ATEMA, Distribution of setae on the *Homarus americanus* lateral antennule flagellum, 182
Gulf of Mexico, 337
Gustation, 273

H

Habitat complexity, 241
HADFIELD, MICHAEL G., see Eric R. Holm, 21
HAMMAR, KATHERINE, see Catherine T. Tamse, 201
HANLEY, JANICE S., NADAV SHASHAR, ROXANNA SMOLOWITZ, ROBERT A. BULLIS, WILLIAM N. MEBANE, HOWAIDA R. GABR, and ROGER T. HANLON, Modified laboratory culture techniques for the European cuttlefish *Sepia officinalis*, 223
HANLON, ROGER T., see Nadav Shashar, 187; Janice S. Hanley, 223; Michael R. Maxwell, 225; Maureen D. O'Neill, 228
HÁROSI, FERENC I., IONE HUNT VON HERBING, and JEFFREY R. VAN KEUREN, Sickling of anoxic red blood cells in fish, 5
HÁROSI, FERENC I., see Nadav Shashar, 187
HARRIS, JENNIFER, see Jennifer Rogers, 235
HAUXWELL, JENNIFER, see Suzanne Graham, 241
Head genes, 370
Hearing, directional, 191
HECK, DIANE E., see Blase Billack, 196
HECK, PRUDENCE T., see Blase Billack, 196
Hemoglobin
  in amphioxus, 255
  sickling, 5
Hemolymph, 43
HENRY, JONATHAN Q., and MARK Q. MARTINDALE, Evolution of cleavage programs in relationship to axial specification and body plan evolution, 363
HERBERHOLZ, JENS, and BARBARA SCHMITZ, Role of mechanosensory stimuli in intraspecific agonistic encounters of the snapping shrimp (*Alpheus heterochaelis*), 156
Herbivory, 233
Hermissenda, learning, 198
HERRING, P. J., see Mark S. Nowel, 290
HESSINGER, DAVID A., see Glyne U. Thorington, 145
Heterochronic, 377
Heterochronic genes in development and evolution, 375
Hindbrain, 220
HO, MICHAEL, see William J. Kuhns, 216
HOBERT, OLIVER, and GARY RUVKUN, A common theme for LIM homeobox gene function across phylogeny? 377
HOLM, ERIC R., BRIAN T. NEDVED, EUGENIO CARPIZO-ITUARTE, and MICHAEL G. HADFIELD, Metamorphic-signal transduction in *Hydroides elegans* (Polychaeta: Serpulidae) is not mediated by a G protein, 21
Home range, 238
Homeobox, 377
HOPKINSON, CHARLES, see Catherine Schmitt, 232
Horizontal cells, 203, 204
HOSKIN, FRANCIS C. G., and JOHN E. WALKER, A closer look at the natural substrate for a nerve-gas hydrolyzing enzyme in squid nerve, 197
Hox gene, 220, 373
Hox genes in arthropod development and evolution, 373
HUANG, LI-FANG, see Kyeng G. Lee, 211
HUGHES, JEFF, see Suzanne Graham, 241
Hyaluronic acid, receptor binding, 216
Hyaluronic acid-receptor binding demonstrated by synthetic adhesive proteoglycan peptide constructs and by cell receptors on the marine sponge *Microciona prolifera*, 216
Hyaluronic receptors of *Microciona* sponges, 216
Hydrodynamic coupling of lobster antennule motion to oscillatory water flow, 180
Hydroides elegans, 213-hydroxykynurenine, 187
α-Hydroxykynurenine, 187

I

Immunohistology, 308
In vivo and *in vitro* growth of nerve parasite from *Lophius americanus*, 227
Induction of extra claws on the chelipeds of a crayfish, *Procambarus clarkii*, 52
Initial baseline blood chemistry of the oyster toadfish, *Opsanus tau*, 228
Innervation, 78
INOUÉ, SHINYA, see Makoto Goda, 212
Interaction of nitrogen supply, sea level rise, and elevation on species form and composition of salt marsh plants, 235
Intrinsic adherence, 145
ISHIKURA, MASAHARU, see Tadashi Maruyama, 70
Isolation and characterization of endostyle-specific genes in the ascidian *Ciona intestinalis*, 60

J

JESSEN-ELLER, KATHRYN, MARJORIE STEELE, CAROL REINISCH, and NICHOLAS SPITZER, Blockade of ryanodine receptors stimulates neurite outgrowth in embryos of *Spisula solidissima*, 206
JOHNSEN, SÖNKE, and EDITH A. WIDDER, Transparency and visibility of gelatinous zooplankton from the northwestern Atlantic and Gulf of Mexico, 337
JOHNSON, AMY S., see Olaf Ellers, 136
Juvenile hormone, 112
Juvenile *Limulus polyphemus* generate two water currents that contact one proven and one putative chemoreceptor organ, 185

K

KACHURAK, KRISTEN A., see Richard A. Tankersley, 168
KANAI, SATORU, see Tadashi Maruyama, 70
KEEFE, D. L., see D. M. Porterfield, 208
Ketone body, 12
KING, JANE ROCHE, and HANS STRAKA, Effects of vestibular nerve lesions on orientation turning in the leopard frog, *Rana pipiens*, 193
KING, LESLIE A., see Robert B. Silver, 209
KING, TERESA, see Earl Weidner, 227
KINSEY, STEPHEN T., see W. Ross Ellington, 264
KIRKPATRICK, JOHN, KEN FOREMAN, and IVAN VALIELA, Dissolved inorganic nitrogen flux and mineralization in Waquoit Bay sediments as measured by core incubations, 240
KITAHARA, TAKUJI, see Isamu Nakatani, 52
KNUDSON, ROBERT, see Makoto Goda, 212
KOHN, ALAN J., see Bruno Pernet, 349
KOROLEVA, ZOYA, see Kyeng G. Lee, 211
KRAUS, DAVID W., see Jamie J. Bishop, 255
KROEGER, KEVIN D., see Martin P.A. Griffin, 233
KUBKE, M. F., E. GILLAND, and R. BAKER, Lipophilic dye labeling distinguishes segregated central components of the eighth cranial nerve in embryonic chicken, 218
KUHNS, WILLIAM J., XAVIER FERNANDEZ-BUSQUETS, MAX M. BURGER, MICHAEL HO, and EVA TURLEY, Hyaluronic acid-receptor binding demonstrated by synthetic adhesive proteoglycan peptide constructs and by cell receptors on the marine sponge *Microciona prolifera*, 216
KUZIRIAN, ALAN M., HERMAN T. EPSTEIN, THOMAS J. NELSON, and NANCY S. RAFFERTY, Lead, learning, and calexcitin in *Hermissenda*, 198

L

Lancelet, 255, 260
LANZA, SERENA, see Giorgio Bavestrello, 120
Largemouth bass, 273
Larvae, 112, 126
LASKIN, JEFFREY D., see Blase Billack, 196
Late postembryonic development of the symbiotic light organ of *Euprymna scolopes* (Cephalopoda: Sepiolidae), 326
LAUFER, HANS, see Uri Abdu, 112
Lead
  concentration in sediments, 243
  effect on *Aplysia*, 201
  neurotoxicity, 198
Lead concentration as an indicator of contamination history in estuarine sediments, 243
Lead, learning, and calexcitin in *Hermissenda*, 198
LEE, KYENG G., NISHAL MOHAN, ZOYA KOROLEVA, LI-FANG HUANG, and WILLIAM D. COHEN, Fluorescence localization of cytoskeletal proteins in fibrin-trapped cells, 211
Leech, 370
LEGRA, JESSICA C., ROSELLE E. SAFRAN, and IVAN VALIELA, Lead concentration as an indicator of contamination history in estuarine sediments, 243
LEGRA, JESSICA C., see Rosell E. Safran, 245
Leukotriene, 209
LEYS, SALLY P., and HENRY M. REISWIG, Transport pathways in the neotropical sponge *Aplysina*, 30
Ligaments, 136
Light organ, 89
Limulus
  chemoreception, 185
  lateral eye, 189
LINSER, PAUL J., WILLIAM E.S. CARR, HOLLY S. CATE, CHARLES D. DERBY, and JAMES C. NETHERTON III, Functional significance of the co-localization of taste buds and teeth in the pharyngeal jaws of the bass, *Micropterus salmoides*, 273
Lipophilic dye labeling distinguishes segregated central components of the eighth cranial nerve in embryonic chicken, 218
Lobster, 180, 182
Lophius americanus, 227
Lucifer yellow, 78

M

MAA, see Mycosporin-like amino acid
Macrobrachium rosenbergii, 112
Macrophage, invertebrate, 89
MACY, WILLIAM K., see Michael R. Maxwell, 225
MALCHOW, ROBERT PAUL, MICHAEL P. VERZI, and PETER J.S. SMITH, Extracellular pH gradients measured from isolated retinal cells, 203
MALCHOW, ROBERT PAUL, see Kristen A. Andersen, 204
MANKAD, RAJ V., ALEXANDER A. GIMELBRANT, and TIMOTHY S. MCCLINTOCK, Consensus translational initiation sites of marine invertebrate phyla, 251
Mariculture, 223
MARTINDALE, MARK Q., see Jonathan Q. Henry, 363
MARUYAMA, TADASHI, MASAHARU ISHIKURA, SATORU YAMAZAKI, and SATORU KANAI, Molecular phylogeny of zooxanthellate bivalves, 70
Maternal genes, 381
Maturation, oocyte, 212
MAXWELL, MICHAEL R., WILLIAM K. MACY, SHOBU ODATE, and ROGER T. HANLON, Evidence for multiple spawning by squids (*Loligo pealei*) in captivity, 225
MBL Photography/Photomicrography Contest 1997–1998, 387
MCCLINTOCK TIMOTHY S., see Raj V. Mankad, 251
MCFALL-NGAI, MARGARET J., see Spencer V. Nyholm, 89; Mary K. Montgomery, 326
MCLEOD, J., see J. A. Stuart, 12
MCNEIL, PAUL L, see Katsuya Miyake, 214
MEAD, KRISTINA S., The biomechanics of odorant access to aesthetascs in the grass shrimp, *Palaemonetes vulgaris*, 184
MEBANE, WILLIAM N., see Janice S. Hanley, 223
Mechanisms of specification in ascidian embryos, 381
Mechanosensory stimulus, 156
MENSINGER, ALLEN F., and MAX DEFFENBAUGH, Prototype rechargeable tag for acoustical neural telemetry, 194
MENSINGER, ALLEN F., see Maureen D. O'Neill, 228
Mesoderm
  amphioxus, 260
  evolution, 367
Metabolism, 12
Metal speciation, 43
Metamorphic-signal transduction in *Hydroides elegans* (Polychaeta: Serpulidae) is not mediated by a G protein, 21
Metamorphosis, 21, 112, 126
Methyl farnesoate, 112
Microciona
  adhesive proteoglycan peptide constructs, 216
  hyaluronic receptors in, 216
Micropterus salmoides, 273
Microscopy
  centrifuge polarizing, 212
  confocal, 1
Migration, 168
Migratory behavior of ovigerous blue crabs *Callinectes sapidus*: evidence for selective tidal-stream transport, 168
MIHASHI, KOSHIN, see Katsuyuki Yamada, 107
Mineral selectivity, 120
Mineralization, 240
MINTEQA2 speciation model, 43
MIYAKE, KATSUYA, and PAUL L. MCNEIL, A little shell to live in: evidence that the fertilization envelope can prevent mechanically induced damage of the developing sea urchin embryo, 214
MOBERG, PHILIP E., see Olaf Ellers, 136
Modified laboratory culture techniques for the European cuttlefish *Sepia officinalis*, 223
MOHAN, NISHAL, see Kyeng G. Lee, 211
Molecular phylogeny of zooxanthellate bivalves, 70
Mollusc, ketone body metabolism, 12

Mollusca, 251
MONTGOMERY, MARY K., and MARGARET J. MCFALL-NGAI, Late post-embryonic development of the symbiotic light organ of *Euprymna scolopes* (Cephalopoda: Sepiolidae), 326
Morphogenesis, 112
Mummichog
  feeding, 241
  population size, 238
  site fidelity, 238
Muscle, 52
Mycosporine-like amino acid, 187
Myotome, 255

N

NAIR, P. SATISH, and WILLIAM E. ROBINSON, Calcium speciation and exchange between blood and extrapallial fluid of the quahog *Mercenaria mercenaria* (L.), 43
NAKATANI, ISAMU, YOSHINORI OKADA, and TAKUJI KITAHARA, Induction of extra claws on the chelipeds of a crayfish, *Procambarus clarkii*, 52
NASA, Genetic Regulatory Networks in Embryogenesis and Evolution, 357
National Aeronautics and Space Administration, see NASA, 357
NEDVED, BRIAN T., see Eric R. Holm, 21
NELSON, THOMAS J., see Alan M. Kuzirian, 198
Nematocyst, 145
Nerve bundle, 52
Nerve parasites in *Lophius americanus*, 227
Nerve-gas, 197
Net primary production, 233
NETHERTON, JAMES C., III, see Paul J. Linser, 273
Neurodevelopment, 206
Neuroethology, 193, 194
Neuropeptide, 308
Nitric oxide, 196
Nitrogen
  fertilization, 180, 235
  loading, 240
  stable isotope, 245
Notochord, 255, 381
NOWEL, MARK S., P. M. J. SHELTON, and P. J. HERRING, Cuticular photophores of two decapod crustaceans, *Oplophorus spinosus* and *Systellaspis debilis*, 290
Nuclear envelope breakdown
  in polychaete, 212
  in sand dollar, 209
Nucleus, descending octaval, 191
Nutrient concentration, 233
NYHOLM, SPENCER V., and MARGARET J. MCFALL-NGAI, Sampling the light organ microenvironment of *Euprymna scolopes*: description of a population of host cells in association with the bacterial symbiont *Vibrio fischeri*, 89

O

O'NEILL, MAUREEN D., HEATHER M. WESP, ALLEN F. MENSINGER, and ROGER T. HANLON, Initial baseline blood chemistry of the oyster toadfish, *Opsanus tau*, 228
Objective lenses, 1
ODATE, SHOBU, see Michael R. Maxwell, 225
OGASAWARA, MICHIO, and NORIYUKI SATOH, Isolation and characterization of endostyle-specific genes in the ascidian *Ciona intestinalis*, 60
OKADA, YOSHINORI, see Isamu Nakatani, 52
Oocyte maturation in *Chaetopterus pergamentaceous* observed with centrifuge polarizing microscope, 212
OOI, E. L., see J. A. Stuart, 12
Oplophorid shrimps, 290
Opsanus tau
  acoustic tagging, 194
  auditory response, 191
  blood chemistry, 238
  infections in, 229
Optical anisotropies, 5
Oxygen, 208

P

PARADISE, KRISTEN, see Elizabeth Quinn, 185
Parasitism, 227, 349
Pb^{2+}, 201
Peptidergic neurons, 282
Peptidergic neurons in barnacles: an immuno-histochemical study using antisera raised against crustacean neuropeptides, 282
PERNET, BRUNO, and ALAN J. KOHN, Size-related obligate and facultative parasitism in the marine gastropod *Trichotropis cancellata*, 349
pH, 203
Pharmacology, 196
Pharyngeal
  jaws, 273
  teeth, 273
Phosphagen kinase, 264
Photophores, 290
Photoreceptor
  extraocular, 78
  sensitivity of, 187
Physiological progenesis in cephalopod molluscs, 17
PISTON, DAVID W., Concepts in Imaging and Microscopy. Choosing objective lenses: the importance of numerical aperture and magnification in digital optical microscopy, 1
Planktonic feeding and evolutionary significance of the lobate body plan within the Ctenophora, 247
Polychaete
  metamorphic signal in, 21
  oocyte maturation, 212
  parasitic, 349
Polymerization, 5
Population size and site fidelity of *Fundulus heteroclitus* in a macrotidal saltmarsh creek, 238
Porifera
  development, 120
  hyaluronic receptors, 216
  transport in, 30
PORTERFIELD, D. M., J. R. TRIMARCHI, D. L. KEEFE, and P. J. S. SMITH, Characterization of oxygen and calcium fluxes from early mouse embryos and oocytes, 208
PORTERFIELD, D. MARSHALL, see Catherine T. Tamse, 201
Post-larva, 112
Preliminary evaluation of sedimentation rates and species distribution in Plum Island Estuary, Massachusetts, 232
Prey
  capture, 193
  selection, 247
Progenesis, 17
PRONZATO, ROBERTO, see Giorgio Bavestrello, 120
Prophase mitotic apparatus, 209
Proprioceptor, 52
Prosobranchia, 308
Prototype rechargeable tag for acoustical neural telemetry, 194
Pseudomonas, 197, 229
Pseudomonas putida infections of the oyster toadfish (*Opsanus tau*), 229

Q

Quinidine, 204
QUINN, ELIZABETH, KRISTEN PARADISE, and JELLE ATEMA, Juvenile *Limulus polyphemus* generate two water currents that contact one proven and one putative chemoreceptor organ, 185

R

RAFFERTY, NANCY S., see Alan M. Kuzirian, 198
RAM, JEFFREY L., CARLOS S. GALLARDO, MICHAL L. RAM, and ROGER P. CROLL, Reproduction-associated immunoreactive peptides in the nervous systems of prosobranch gastropods, 308
RAM, MICHAL L., see Jeffrey L. Ram, 308
REINISCH, CAROL, see Kathryn Jessen-Eller, 206
REISWIG, HENRY M., see Sally P. Leys, 30
Release response, 145
Reproduction
  bryozoan, 126
  coral, 319
  gastropod, 308
Reproduction-associated immunoreactive peptides in the nervous systems of prosobranch gastropods, 308
Resolution, 1
Retina
  pH gradients, 203
  damage to, 187
Reynolds number, 184
Rhombomeric organization of brainstem motor neurons in larval frogs, 220
RINKEVICH, BARUCH, IRVING L. WEISSMAN, and ANTHONY W. DETOMASO, Transplantation of Fu/HC-incompatible zooids in *Botryllus schlosseri* results in chimerism, 98
ROBINSON, WILLIAM E., see P. Satish Nair, 43
RODHOUSE, PAUL G., Physiological progenesis in cephalopod molluscs, 17
ROGERS, JENNIFER, JENNIFER HARRIS, and IVAN VALIELA, Interaction of nitrogen supply, sea level rise, and elevation on species form and composition of salt marsh plants, 235
Role of mechanosensory stimuli in intraspecific agonistic encounters of the snapping shrimp (*Alpheus heterochaelis*), 156
RUTA, VANESSA J., FREDERICK A. DODGE, and ROBERT B. BARLOW, Efferent modulation of physiological properties of the *Limulus* lateral eye, 189
RUVKUN, GARY, see Frank Slack, 375; Oliver Hobert, 377
Ryanodine, 206

S

SAFRAN, ROSELLE E., JESSICA C. LEGRA, and IVAN VALIELA, Effects of nitrogen loading on eelgrass seed coat abundance, C to N ratios, and Δ15N in sediments of Waquoit Bay, 245
SAFRAN, ROSELLE E., see Jessica C. Legra, 243
SAGI, AMIR, see Uri Abdu, 112
SAKAI, KAZUHIKO, Effect of colony size, polyp size, and budding mode on egg production in a colonial coral, 319
Salt marsh, 180, 232, 235, 238
Sampling the light organ microenvironment of *Euprymna scolopes*: description of a population of host cells in association with the bacterial symbiont *Vibrio fischeri*, 89
SARÀ, MICHELE, see Giorgio Bavestrello, 120
SATOH, NORIYUKI, Mechanisms of specification in ascidian embryos, 381
SATOH, NORIYUKI, see Michio Ogasawara, 60
SBFI, sodium indicator, 204
SCHMITT, CATHERINE, NATHANIEL WESTON, and CHARLES HOPKINSON, Preliminary evaluation of sedimentation rates and species distribution in Plum Island Estuary, Massachusetts, 232
SCHMITZ, BARBARA, see Jens Herberholz, 156
Scleractinian, 319
Sea anemone, 145
Sea level rise, 180, 235
Sea urchin
  fertilization, 107, 214
  skeleton, 136
  tube foot contraction, 196
Sediments
  deposition, 232
  lead in, 243
  N flux and mineralization in, 240
  organic matter content, 232
Segment development, 373
Sepia officinalis, 223
Serotonin, 206
Setae, 182
SHANKLAND, MARTY, and ASHLEY E. E. BRUCE, Axial patterning in the leech: developmental mechanisms and evolutionary implications, 370
SHASHAR, NADAV, FERENC I. HÁROSI, ANASTAZIA T. BANASZAK, and ROGER T. HANLON, UV radiation blocking compounds in the eye of the cuttlefish *Sepia officinalis*, 187
SHASHAR, NADAV, see Janice S. Hanley, 223
SHELTON, P. M. J., see Mark S. Nowel, 290
Sickling of anoxic red blood cells in fish, 5
SIGALA, MARCO A., see Richard A. Tankersley, 168
Signal transduction, 21
SILVER, ROBERT B., LESLIE A. KING, and ALYSSA F. WISE, Calcium regulatory endomembranes of the prophase mitotic apparatus of sand dollar cells contain enzyme activities that produce leukotriene B_4 but not 1,4,5-inositol triphosphate, 209
Size-related obligate and facultative parasitism in the marine gastropod *Trichotropis cancellata*, 349
Skeleton, sea urchin, 136
SLACK, FRANK, and GARY RUVKUN, Heterochronic genes in development and evolution, 375
SMITH, PETER J. S., see Catherine T. Tamse, 201; Robert Paul Malchow, 203; D. M. Porterfield, 208
SMOLOWITZ, ROXANNA, ELIZABETH WADMAN, and H. M. CHIKARMANE, *Pseudomonas putida* infections of the oyster toadfish (*Opsanus tau*), 229
SMOLOWITZ, ROXANNA, see Janice S. Hanley, 223
Snapping shrimp, 156
Spawning, 168
Specific gene, 60
Spermatozoa, 264
Spiralia, 363, 367
Spirocyst, 145
SPITZER, NICHOLAS, see Kathryn Jessen-Eller, 206
Sponge, see Porifera
Squid
  fecundity, 225
  fishery, 225
  light organ, 326
  nerve, 197
STACH, THOMAS, Coelomic cavities may function as a vascular system in amphioxus larvae, 260
Start site, 251
STEELE, MARJORIE, see Kathryn Jessen-Eller, 206
Stomatopod, 184
STRAKA, HANS, EDWIN GILLAND, and ROBERT BAKER, Rhombomeric organization of brainstem motor neurons in larval frogs, 220
STRAKA, HANS, see Jane Roche King, 193
Strength, 136
Strongylocentrotus, 136
Structural strengthening of urchin skeletons by collagenous sutural ligaments, 136
STUART, J. A., E. L. OOI, J. MCLEOD, A. E. BOURNS, and J. S. BALLANTYNE, D- and L-ß-hydroxybutyrate dehydrogenases and the evolution of ketone body metabolism in gastropod molluscs, 12
Suspension feeding, 349
SWEENEY, JENNIFER, LINDA DEEGAN, and ROBERT GARRITT, Population size and site fidelity of *Fundulus heteroclitus* in a macrotidal salt-marsh creek, 238
Symbiosis
  in bivalves, 70
  in squid, 89, 326
Symmetry, 370

T

TAKAC, PETER, see Uri Abdu, 112
TAMSE, CATHERINE T., KATHERINE HAMMAR, D. MARSHALL PORTERFIELD, and PETER J. S. SMITH, Transmembrane calcium flux in Pb^{2+}-exposed *Aplysia* neurons, 201
TANKERSLEY, RICHARD A., MARIA G. WIEBER, MARCO A. SIGALA, and KRISTEN A. KACHURAK, Migratory behavior of ovigerous blue crabs *Callinectes sapidus*: evidence for selective tidal-stream transport, 168
Taste buds, 273
Tegula, 308
Telemetry, 194
Temperature dependence, 107
Temperature-independent period immediately after fertilization in sea urchin eggs, 107
The biomechanics of odorant access to aesthetascs in the grass shrimp, *Palaemonetes vulgaris*, 184
THORINGTON, GLYNE U., and DAVID A. HESSINGER, Efferent mechanisms of discharging cnidae: II. A nematocyst release response in the sea anemone tentacle, 145
Toadfish, see *Opsanus tau*
Tracking turbulence: processing the bimodal signals that define an odor plume, 179
Translation, 251
Transmembrane calcium flux in Pb^{2+}-exposed *Aplysia* neurons, 201
Transparency, 337
Transparency and visibility of gelatinous zooplankton from the northwestern Atlantic and Gulf of Mexico, 337
Transplantation of Fu/HC-incompatible zooids in *Botryllus schlosseri* results in chimerism, 98
Transport pathways in the neotropical sponge *Aplysina*, 30
Transport, selective tidal-stream, 168
TRIMARCHI, J. R., see D. M. Porterfield, 208
Trochoblast, 367
TROLL, WALTER, see Blase Billack, 196
TURLEY, EVA, see William J. Kuhns, 216

U

Ubx regulation, 373
Ultrastructure
  amphioxus, 260
  photophore, 290
Ultraviolet radiation, 187
Urbanization, 243
UV radiation blocking compounds in the eye of the cuttlefish *Sepia officinalis*, 187

V

VALIELA, IVAN, see Jennifer Rogers, 235; John Kirkpatrick, 240; Jessica C. Legra, 243; Rosell E. Safran, 245
VAN DEN BIGGELAAR, J. A. M., see A. E. van Loon, 367
VAN KEUREN, JEFFREY R., see Ferenc I. Hárosi, 5
VAN LOON, A. E., and J. A. M. VAN DEN BIGGELAAR, Changes in cell lineage specification elucidate evolutionary relations in Spiralia, 367
VANDERGON, THOMAS L., see Jamie J. Bishop, 255
VERZI, MICHAEL P., see Robert Paul Malchow, 203
Vestibular system, development, 218
Vibrio, 89, 326
Visibility, 337
VON HERBING, IONE HUNT, see Ferenc I. Hárosi, 5

W

WADMAN, ELIZABETH, see Roxanna Smolowitz, 229
WALKER, JOHN E., see Francis C. G. Hoskin, 197
Water jet, 156
WEAVER, MATTHEW, and JELLE ATEMA, Hydrodynamic coupling of lobster antennule motion to oscillatory water flow, 180
WEBSTER, S. G., Peptidergic neurons in barnacles: an immuno-histochemical study using antisera raised against crustacean neuropeptides, 282
WEIDNER, EARL, and TERESA KING, *In vivo* and *in vitro* growth of nerve parasite from *Lophius americanus*, 227
WEISSMAN, IRVING L., see Baruch Rinkevich, 98
WENDT, DEAN E., Effect of larval swimming duration on growth and reproduction of *Bugula neritina* (Bryozoa) under field conditions, 126
WESP, HEATHER M., see Maureen D. O'Neill, 228
WESTON, NATHANIEL, see Catherine Schmitt, 232
WIDDER, EDITH A., see Sönke Johnsen, 337
WIEBER, MARIA G., see Richard A. Tankersley, 168
WILLIAMSON, RODDY, see Christopher S. Cobb, 78
WISE, ALYSSA F., see Robert B. Silver, 209
Wounding, on propodus, 52

Y

YAMADA, KATSUYUKI, and KOSHIN MIHASHI, Temperature-independent period immediately after fertilization in sea urchin eggs, 107
YAMAZAKI, SATORU, see Tadashi Maruyama, 70

Z

Zooplankton, 337
Zooxanthellae, 70
Zostera marina, see Eelgrass